Technology Opportunity

Fiber-Optic High-Temperature Sensor System

SENTEC Corporation and the National Aeronautics and Space Administration (NASA) Lewis Research Center seek potential users of a fiber-optic high-temperature sensor that has the potential to operate under and monitor temperatures from 0 to over 800 °C (1472 °F) in harsh environments.

Potential Commercial Uses

- Aeropropulsion system control
- Military vehicle and ship (surface and submarine) engine control
- Conventional and nuclear power plant temperature monitoring
- Industrial applications for high-precision, harsh-environment temperature control

Benefits

- The sensor can cover the entire temperature range required for propulsion system control. (Existing fiber-optic sensors cannot measure temperatures in the 500 to 800 °C range.)
- Reliability of the sensor is much higher than for other optical fiber sensors because of the redundant data-gathering method.
- The sensor is immune to electromagnetic interference.
- It is compact, robust, and lightweight.

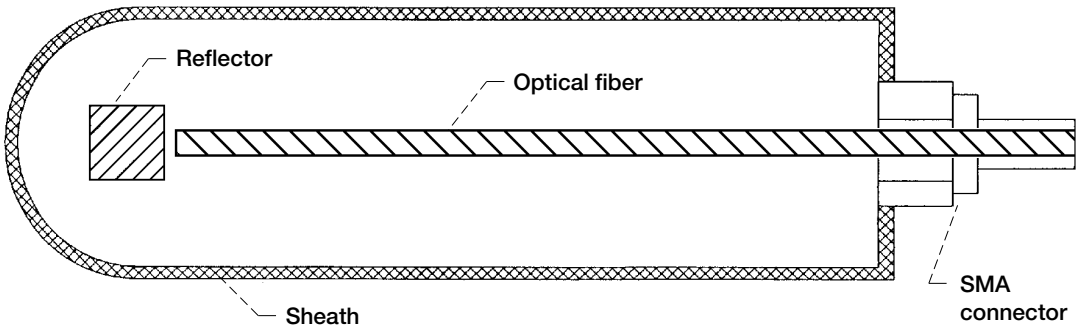
The Technology

This sensor is constructed by forming a Fabry-Perot interferometer between the polished end of a high-temperature optical sapphire fiber and a polished, high-temperature metal surface. White light is launched into one end of the optical fiber. On the opposite end, the light encounters the "Fabry-Perot" interferometer and sends back a reflected white light interference fringe. This fringe pattern, which resembles a series of sine curves, travels down the fiber to a spectroscopic detector.

The detector is connected to a computer that reads the interference fringes. Because fringe spacing varies with temperature changes, the computer can convert the detector data into temperatures by determining the distances between the fringes. An engineering prototype of this sensor is currently being tested on the NASA Lewis OV-10D airplane to measure the exhaust gas temperature.

Options for Commercialization

SENTEC seeks a strategic alliance or licensing agreement with a company capable of commercializing this high-temperature fiber-optic sensor technology. Industries where this technology could be



Fabry-Perot type temperature sensor with stainless steel shroud.

National Aeronautics and
Space Administration
Lewis Research Center

applied include aeronautics, military vehicles, conventional and nuclear power plants, and industrial plants. A patent was applied for this year.

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